Water Quality Team Meeting Notes

January 17, 2006

1. Greetings and Introductions.

Today's meeting of the Water Quality Team was chaired by Mark Schneider and facilitated by Robin Harkless. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at this meeting. Anyone with questions or comments about these notes should contact Kathy Ceballos at 503-230-5420.

2. Zebra Mussel Briefing.

Stephen Phillips of the Pacific States Marine Fisheries Commission briefed the WQT on the potential for zebra mussels, an invasive species that has caused serious economic and infrstructure problems in waterways in eastern North America, to impact the Columbia basin. Working from a series of PowerPoint slides, Phillips and co-presenter Mark Sytsma of Portland State University, touched on the following topics:

- Range (22 states and two Canadian provinces)
- Characteristics
- Habitat requirements: 8-12 degrees C, salinity up to 10 parts per thousand, calcium in the 20-50 mg/liter range, Ph of 7 tp <9, maximum attainment velocities of up to 1 meter/second.
- Range expansion: Within 10 years of their introduction, zebra mussels spread rapidly throughout the Great Lakes and Mississippi River drainages through impressive reproductive capacity and passive downstream drift. Zebra mussels move between water bodies by attaching themselves to boat hull, trailers or aquatic weeds that are caught on propellers or on a trailer, or by contaminating live wells, bait buckets and bilges. They can survive *outside* the water for up to five days.
- Columbia River Basin threat? In March 2005, a zebra mussel-infected boat was intercepted in the Galletin Valley on Montana; in October 2005, a jar of freshly-dead zebra mussels was left on the doorstep of the Charles M. Russell Wildlife Center near Fort Peck Reservoir in Jordan, Montana.
- Threats to salmon: if introduced to the Columbia River Basin, zebra mussels would adversely impact the health of Pacific salmonid stocks by attaching to fish ladders, diversion screens, pipes, conduits and other underwater components, including trash racks and removable spillway weirs.

- Prevention: agency response – since 1999, BPA has funded the PSMFC and Portland State University to study zebra mussel prevention, education, monitoring and to develop a response program
- Rapid response: Over the past year, agency efforts have been concentrated on developing a zebra mussel rapid response plan for the Columbia River Basin, which will guide strategy, activities and d3ecision-making criteria in the vent an introduction occurs.
- Rapid response:

Jim Irish said the reason for this presentation was to give the WQT a heads-up so that they can start thinking about this situation, so that when the time comes to seek permits for remedial actions, it will be possible to provide a rapid, reasoned response. Forewarned is forearmed, he said; the harm zebra mussels have done to facilities in the eastern portion of the U.S. has been immense. Some facilities have had to do a manual drawdown and scraping of each dam at a cost of $175,000 to $350,000 per year. One of the most effective means of zebra mussel removal is a hot-water lance, which blows the mussels off the dam and kills them; unfortunately EPA ruled that that method was no longer permitted, because of temperature exceedences in the mixing zone.

Another option, said the presenters, is a gradual-release system dispensing measured doses of chlorine/sodium hypochlorite. In Oregon, you don't need a permit to dispense aquatic pesticides; in Oregon, you do, said Mark Sytsma of PSU. I'm not sure what the requirement is in Washington, because the Columbia, obviously, is a shared waterway. Agnes Lut replied that if a permit is required in Washington, Oregon would require a permit also. Clamtrol, chlorine and heat are other potential alternatives. And you will have a draft plan out soon? Lut asked. We will, Phillips replied. It is hard for us to get access to the dams; right now BPA and the Corps are figuring out how exactly to plug into this. We've been discussing getting ready for this for years, but there are so many other issues in the basin, and these creatures are not yet here, so this hasn't been as high a priority. We'll have something more substantive for you to read and comment on in the near future – in the next month or two, Phillips said.

Mainly, we wanted to talk to the WQT because there are representatives from all of the major players that have to be involved, said Irish. I hope you'll start thinking about this, so that when the time comes, we can move quickly.

One obvious question, said John Picinininni – what do you do with the mussels once you get them off? Can they be ground up into fertilizer, or are they just thrown in the landfill? Do the mussels bioaccumulate the pesticides, then discharge them into the environment? They are one of the best toxin storers and accumulators in the world, Irish replied – they actually remove toxins from the water and tore them. Zebra mussels cannot be used as fertilizer, for that reason, said Phillips.

Ecologically, there could be very dramatic consequences if the zebra mussels take hold here, said Sytsma – not only are they toxin bioaccumulators, but they are also

very efficient filter feeders. There could be nothing left for the juvenile salmonids to eat, he said.

So the focus of this program is specifically the hydropower projects? Margaret Filardo asked. Shouldn't the program have a broader scope, given these potentially devastating ecosystem impacts? Yes, Phillips replied, but we're working with the funding we have, presently. Jim Athearn has done some work on this issue, added Irish; in 1999 he produced a paper on this topic. Athearn is currently a contractor working for us, added Phillips.

The real question is, how much effort do you put into developing a mitigation plan for a threat that isn't here yet? Phillips said – how hard should we be trying to sell this program to politicians and other decision-makers? The most important thing is to have a workable and effective plan in place and ready to go once the invasion begins.

With respect to next steps, you have a rapid response plan that will be available soon, said Schneider. You wanted to talk to the WQT today mainly so that we were aware of the problem? One thing we need to know is what kinds of permits we will need to begin an eradication program, and what the process is for ESA consultation, Phillips replied. He asked that any comments or information the WQT may want to share be communicated directly to him. In response to a question, Sytsma said one important thing to bear in mind is that zebra mussels can move; it is very possible for them to move upstream if they become established at the mouth of the Columbia.

What do you need from us next? Schneider asked. Two things, Phillips replied – people in this room we can talk to, who can put us in touch with policy personnel at their agencies. A second point is, would the level of sodium hypochlorite we propose to use require permits and, if so, which permits? Third, he said, we need to know how involved the WQT wants to be in this process. In terms of who to contact, said Schneider, I would suggest that you contact me, at least initially.

The ultimate goal is to develop a rapid response plan with all of the necessary permits in place, that we could simply pull off the shelf and implement immediately if zebra mussels appear, Irish said. And are you planning to do an EA? Lut asked. That's one of the things we need to determine, Phillips replied. And will the rapid response plan lay out several options, or are you focused only on sodium hypochlorite? Lut asked. We will lay out lots of options, Phillips replied. However; you can bet that every option will have at least some water quality impact, Sytsma observed. It was agreed that Lut would be the best initial point of contact at ODOE.

Jesse Colossius of WDOE asked about the involvement of Idaho in the zebra mussel program. Idaho will be a part of this, Phillips replied. And have there been any interceptions of zebra mussel-infected vessels in the Snake system? Colossius asked. Not yet, but a vessel was intercepted in the Columbia near Spokane, Sytsma replied. If they get into Fort Peck Reservoir in Montana (where a jar of freshly dead zebra mussels

was left on the doorstep of the Charles M. Russell Wildlife Center near Fort Peck Reservoir last October), then we'll need to move very, very quickly, he noted.

Is the WQT interested in becoming involved in this issue? Harkless asked. I think the answer is, we may not have a choice, Schneider replied – if zebra mussels become a water quality problem and consultation is required, NOAA Fisheries will certainly be involved.

3. Response to Comments on Draft "Total Dissolved Gas Effects on Fishes of the Lower Columbia River: Synthesis of Literature 1996-2005."

Jim Adams apologized, saying that the response to comments is not yet finalized. He said comments have been received from Oregon, CRITFC and NOAA Fisheries. Rudd Turner said he hopes that, by the end of this week, the Corps can finalize something and get it over to Mark Schneider.

4. Lower Columbia River TDG Management Strategy and Monitoring Program

The overall concept of what the policy group has developed is to get a handle on Lower Columbia TDG management, said Rudd Turner. One point I've made to Mark is that Lower Columbia TDG management is more of a concept than a concrete proposal. The concept was kicked off at a federal meeting last May. Several determinations emerged from that meeting and a subsequent meeting or two. One is that the Camas Washougal gauge issue has been on the table for some time; recent discussions haven't been too productive, and a new approach is needed. The group thought more of an ecosystem approach would be more appropriate, looking at all of the factors influencing the TDG picture below Bonneville – main sources of TDG, how Bonneville operations contribute to TDG production, what biological benefits derive from those operations, and what the impacts of TDG might be on critical habitat below the dam, and on listed salmon during critical life-history stages.

The goal is to reach consensus on an optimum Bonneville operation that provides good fish passage conditions while minimizing TDG impacts below the dam, said Turner. The next question is, how do you monitor that, and where? At Camas/Washougal? At Camas/Washougal plus another site? The group has talked further and identified three key areas where information needs to be gathered: first, to synthesize the state of current biological information (the PNNL report), second, conduct field investigations of chum salmon spawning, incubation and emergence below Bonneville, and third, assess in detail the biological benefits accruing from the current operations and configuration at Bonneville, Turner said.

You've seen the PNNL report and had an opportunity to comment, said Turner; as you know, it concludes that the TDG effects of the current operational regime are more in the chronic realm, rather than the lethal realm. In other words, there are TDG impacts, but they are in the sublethal range. The Corps will be conducting chum

incubation and emergence studies in 2006 to determine TDG levels at the redds and in the gravel, and biological effects on chum. The report on that study should be available in late 2006. David Wills said he did not remember that the biological component of this study was funded for FY'06.

With respect to the geographic footprint, said Turner, I think we're pretty much in agreement that it will include river-mile 45 up to the dam – in other words, 100 miles or so downstream of Bonneville Dam. With respect to Bonneville fish passage, the third piece of this, the Corps FFDRWG group is discussing that; AFEP and SRWG are also looking at the study design. The Corps is in the process of updating the Bonneville decision document, and is considering adding this issue to include consideration of what operation is best for fish.

Again, our approach is to gather information on some of these factors, and assess the biological impacts of the current operation, Turner said. There are some needs out there, in order to move forward with this; one is regional support. Do you care about sublethal or chronic effects? From the Corps' perspective, we do, said Turner – we are concerned about this. Program management to ensure that all of the pieces come together efficiently is also needed; the Corps is willing to do that, but some funding will be needed – Corps funding is very tight. Finally, we need some kind of interdisciplinary review group to take a look at this program, said Turner; in our view, there is no single group already in existence that can evaluate the water quality, fish passage and biological facets of this issue. In all likelihood, some sort of synthesis of several different groups will likely be needed.

The Corps has moved head on some of the information-gathering, said Turner; we're moving as fast as we can, and as funding allows. My understanding is that we were moving forward on this in support of the re-application for waivers in 2007-2008, said Jim Adams. That's part of it, yes, Turner replied. That doesn't leave much time to conduct research, Wills observed.

Cathy Tortorici said that, from her perspective, it isn't clear that a significant problem even exists. Cathy expressed concern that the Corps is moving rapidly ahead with this very large study before the extent of the problem is known, in terms of actual detrimental biological effects. That is the real question, said Schneider – where do we see the detrimental biological effects, and are they a cause for concern? Tortorici said that, based on what the NMFS Science Center is telling her, there may not be a significant problem. She said she had discussed the potential impacts of lower river TDG on estuary habitat restoration projects, particularly in the realm of sublethal TDG levels canceling out mitigation credits for habitat projects that have already been done. The Science Center advised her that no problem has been observed with the low levels of TDG typical of the shallow areas near the river shore. I'll continue to watch your work with a great deal of interest, Tortorici said. The expense and potential duplication of effort connected with this effort were also cited as points of concern.

Tortorici commented further that habitat projects, e.g. tide gate alterations, have been done to mitigate for the fish in the lower river; the implications of the COE statements and moving forward with monitoring is that the mitigation measures may not have been enough. Cathy cautioned the COE to take this into consideration as they make decisions about how to proceed. Also consider how to integrate this effort with monitoring that is already happening on the lower river, e.g. by the Lower Columbia River Estuary Partnership. Do not duplicate the work that NOAA and others have already done.

The group devoted a few minutes of additional discussion to this topic. Schneider noted that his main comment on the report was that much of what the Corps concluded was alleged – it was not backed up with scientific fact. Ultimately, Turner said that a phased approach, beginning with additional TDG monitoring in critical shallow-water areas, might be an appropriate place to begin.

The report will be finalized by next week, and we will also have our response to technical comments at that time, said Turner. I will send those to Mark Schneider as soon as they're available. It sounds as though there is also a need for some clarification about what chum studies will be going forward in 2006, said Harkless. We will revisit this topic at the February WQT meeting.

One question, said John Picininni – what did the literature say about the impact of TDG in shallow-water areas? Also, the final report on temperature effects in the Lower Snake River is now available via the BPA website; we will be accepting comments on the report through next week.

5. Management of Spill at Bonneville Dam: Cascades Island TDG Gauge.

Adams led this presentation. Using a series of PowerPoint slides, he touched on the following major topics:

- History of TDG exchange and monitoring at Bonneville Dam – prior to the 2002 spill season, TDG content in the spillway exit channel was consistently greater than 120%; the tailwater station used was Warrendale, six miles below the dam. For the 2002 spill season, spillway deflectors were added to six additional bays; the spill pattern was changed, and the TDG content in the spillway exit channel was lowered significantly under comparable flows.
- History of TDG exchange during 2003 and 2004 spill seasons – continued refinement and experimentation.
- History of TDG exchange during 2005 spill season – produced the most comprehensive measure of TDG impacts in the tailrace, but the issue of bias at higher TDG loadings persists.
- Issue: TDG levels immediately below the aerated zone depend upon location within the channel and spill rate; the location of the Cascades Island TDG gauge

under-represents TDG levels within the spillway channel at higher rates of spill.

- Cascades Island FMS location – aerial photo
- Spillway discharge vs. TDG saturation, April, July 2002 (graph)
- Bonneville spillway channel (aerial photo)
- Comparison of TDG from 2002 study and Cascades Island gauge, 2005 (graph) – no significant difference between the two.

Adams showed a series of slides and videos illustrating Bonneville operations vs. percent TDG at Bonneville, Warrendale and Cascade Islands, noting that, again, the bottom line is that, when spill volumes at Bonneville are high, the Cascades Island gauge consistently under-represents TDG levels downstream of Bonneville. In response to a question from Schneider, Adams said that while the difference in actual readings between the Cascades Island and Warrendale FMS is small, the Warrendale readings should be consistently less than the measurements at Cascades Island.

Are you asking, then, whether the Cascades Island station should be moved or recalibrated? one participant asked. I'm not making any proposals at this point, in terms of potential remedies, Adams replied – I'm simply presenting the science and asking for the WQT's input.

Moving on, Adams touched on:

- The State of Oregon TDG standard – specific language
- The State of Washington TDG standard – specific language
- Lower Columbia River TDG TMDL – specific language related to where water quality parameters should be measured below dams
- Mixing zone provision in TMDL (diagram)

What the Corps needs to know is, where is the appropriate point of sample collection? Adams asked. The language in the Oregon standard is slightly different from that in the Washington standard, which says "any point of sample collection," vs. the language "...at the point of sample collection" language in the Oregon standard. We need some guidance from the WQT as to how we should approach this issue, Adams said.

Adams next moved on to:

- Sample TDG management criteria for Bonneville spill – percent TDG difference between peak levels and at Cascades Island vs. the difference in percent TDG saturation (graph)
- Spill statistics 2000-2005 (nighttime spill only): table.
- Sample TDG management criteria for Bonneville spill – percent TDG difference between cross-sectional average and at Cascades Island vs. the difference in percent TDG (graph)

Adams said that, in the Corps' view, the latter graph represents the more workable and accurate alternative, in terms of how TDG is managed at Bonneville using the Cascades Island gauge.

The group devoted a lengthy discussion to the possible factors influencing the differential readings at Cascades Island and Warrendale, including the influence of gas produced by the B2 corner collector. Ultimately, Schneider said that the best way to engage the WQT on this issue is to wait until the Corps' report on this topic is finalized, so that the group has something to comment on. I'm not sure what the status of that report is, but I'll check with Mike Schneider, said Adams.

Adams then discussed two other issues: the contribution of the B2 corner collector to TDG loading, and the fact that tailwater elevation has not yet been factored into the Corps' analysis. The reason I'm bringing this topic up is that it is integral to developing a spill management plan for Bonneville, and a TDG management strategy for the reach below Bonneville, Adams said. It is apparent that the Cascades Island station alone isn't giving us a true picture of the TDG situation below Bonneville. Should we install a transect array? We need to have a spill management discussion so that we can design a monitoring strategy based on a monitoring array we can really use, Adams said.

I need some time to study what you've presented today, said Schneider. All I'm asking is, should we be approaching this differently, rather than managing to a simple standard, 120% at Cascades Island? Adams said. All of this needs to be filtered through what the Oregon and Washington standards actually say, he added.

It sounds, then, as though Mike Schneider has some minor tweaking to do on the data, said Harkless; once that is done, perhaps he could forward that to Mark Schneider. I can do that, but I'm not sure when the report will be done, Adams said – my concern is that you fully understand all of the implications of this issue. We've been discussing this for a long time, said Schneider – the study was done in 2002. I understand that the spill season is coming at us soon, but since no major modifications to the monitoring program below Bonneville are proposed for 2006, I think it is important for the WQT to have a thorough understanding of what the data are telling us so that we can have an informed discussion before making any recommendations.

5. Next WQT Meeting Date.

The next meeting of the Water Quality Team was set for Tuesday, February 14. Meeting summary prepared by Jeff Kuechle, BPA contractor.